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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10,098,706	03/15/2002	Rama J. Hegde	SC11697TP	2984

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MOTOROLA INC
AUSTIN INTELLECTUAL PROPERTY
LAW SECTION
7700 WEST PARMER LANE MD: TX32/PL02
AUSTIN, TX 78729

EXAMINER

SARKAR, ASOK K

ART UNIT PAPER NUMBER

2829

DATE MAILED: 04/01/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/098,706

Applicant(s)

HEGDE ET AL.

Examiner

Asok K. Sarkar

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 15 March 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) 13-25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-12 and 26-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on 15 March 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:

Group I. Claims 1 – 12 and 26 - 31, drawn to a transistor device, classified in class 257, subclass 411.

Group II. Claims 13 - 25, drawn to method of forming gate dielectric, classified in class 438, subclass 216.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions Group II and Group I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case, the product as claimed can be made by another and materially different process such as depositing the dielectric layers by sputter deposition of metal oxides instead of CVD or ALD.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with Mr. James L. Klingan, Jr. on March 20, 2003 a provisional election was made with traverse to prosecute the invention of Group I, claims 1 – 12 and 26 - 31. Affirmation of this election must be made by the applicant in replying to this Office action. Claims 13 – 25 were withdrawn from further

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consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1 – 12 and 26 – 31 are rejected under 35 U.S.C. 102(e) as being anticipated by Ma, US 6,407,435.

Regarding these claims, Ma teaches a transistor device 10 and 110 comprising a semiconductor substrate 12 or 112, source 21, drain 23 and a channel 15 (see Figs. 1 – 4), a gate electrode 118 over the channel 15, a gate dielectric 116 (see Fig. 2) between the semiconductor substrate 112 and the gate electrode 118 (see Fig. 2). The gate dielectric comprises a layer 130 of substantially pure amorphous aluminum oxide (see interposing materials of amorphous aluminum oxide in column 4, lines 13 – 35), a

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second layer 140 of substantially pure hafnium oxide or zirconium oxide deposited by ALD (see column 2, line 55) and a third layer 150 of substantially pure amorphous aluminum oxide. The detail description of all limitations contained in these claims as well as the reasoning for using the stacked dielectric structures of $\text{Al}_2\text{O}_3/\text{HfO}_2$ or $\text{ZrO}_2/\text{Al}_2\text{O}_3$ are provided by Ma throughout the disclosure, especially under the heading "Summary of the Invention" and also under detailed description in columns 3 and 4 and with reference to figs. 1 – 4.

8. Claims 1 – 12 are rejected under 35 U.S.C. 102(e) as being anticipated by Haukka, US 2002/0115252.

Regarding these claims, Haukka teaches a transistor device comprising a semiconductor substrate 40 (see Fig. 1), a gate dielectric 15 (see Fig. 1) which is between the semiconductor substrate and the gate electrode. The gate dielectric comprises a layer 12 of substantially pure amorphous aluminum oxide (see interposing materials of amorphous aluminum oxide in column 4, lines 13 – 35), a second layer 20 of substantially pure hafnium oxide or zirconium oxide deposited by ALD and a third layer 10 of substantially pure amorphous aluminum oxide as explained in details in pages 2 and 3 and with reference to Fig 3.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Bai, US 2001/0013629; Mogami, US 2001/0053601 and Shinriki, US 5,292,673 teach multiplayer stacked gate dielectric layers comprising $\text{Al}_2\text{O}_3/\text{HfO}_2$ or $\text{ZrO}_2/\text{Al}_2\text{O}_3$.


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10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Asok K. Sarkar whose telephone number is 703 308 2521. The examiner can normally be reached on Monday - Friday (8 AM- 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kammie Cuneo can be reached on 703 308 1233. The fax phone numbers for the organization where this application or proceeding is assigned are 703 308 7722 for regular communications and 703 308 7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 4918.

Asok K. Sarkar
March 21, 2003



KAMAND CUNEO
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2000